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cuaro; *Zoogoneticus miniatus*, from Lake Chalco; *Skiffia lermæ*, from Lake Patzcuaro and Rio Lerma; *Skiffia variegata*, from Lake Zirahuen; *Heterandria lutzi*, from Oaxaca; *Xiphophorus jalapæ*, from Jalapa; *Chirostoma attenuatum*, from Lake Patzcuaro; *Chirostoma labarcæ*, from Rio Lerma; *Chirostoma patzcuaro*, from Lake Patzcuaro; *Chirostoma zirahuen*, from Lake Zirahuen; *Melaniris balsanus*, from Rio Balsas; *Lepomis occidentalis*, from Chihuahua; *Cichlasoma eigenmanni*, from Pueblo; *Gobius parvus*, from Vera Cruz; and *Gobius claytoni*, from Vera Cruz. These two species are apparently referable to Ctenogobius. *Chirostoma lucius* is identified with *C. crystallinum*, not with *C. lermæ*.

The most remarkable feature of this fauna is the extraordinary number of closely related species of Atherinidæ, alike in size, color, and appearance, and living in the same waters.

Jordan and Snyder found, in 1895, six such species, each about a foot long, in Lake Chapala. To this list Dr. Meek makes further additions. All these fishes are excellent as food and all locally known alike as Pescado Blanco de Chapala. Dr. Meek unites the small genera Eslopsarum (with large scales) and Lethostole (translucent, with crenate scales) to Chirostoma. The genus as thus constituted is known only from the table-lands of Mexico.

The species are distributed as follows;

Lake Chalco (City of Mexico): *Chirostoma jordani*, *C. humboldtianum*.

Aguas Calientes, *E. arge*.

Lake Chapala, with L. Zirahuen and Rio Lerma: *C. bartoni*, *C. labarcæ*, *C. zirahuen*, *C. chapalæ*, *C. grandocule*, *C. promelas*, *C. lucius*, *C. sphyræna*, *C. lermæ*, *C. ocotlane*, and *C. estor* (= *C. album*).

Lake Patzcuaro: *C. attenuatum*, *C. patzcuaro*, *C. humboldtianum*, *C. grandocule*, and *C. estor*.

Dr. Meek has several interesting suggestions concerning geographical distribution. These isolated rivers and lakes have fish faunas to be compared with those of rivers on different islands, separated by the sea. But the barriers of ocean are often more easily passed than those of the Sierra Madre. The new species are all well figured. D. S. J.

Fishes of Formosa. — In the proceedings of the United States National Museum, Vol. XXV, pp. 315–368, Jordan and Evermann give an account of the Formosan fishes contained in museums of Japan. Two collections were studied, — the one made by Mr. T.

Tada of Osaka for the Imperial University, the other by Japanese officers for the imperial school of fisheries; 186 species in all were examined. Seventeen new species are described and figured. With them are two new genera, — Zacco (Cyprinidæ), based on *Opsariichthys platypus* and Evenchelys (Murænidæ), based on *Gymnothorax macrurus*. The summary shows that the fauna of Formosa is essentially similar to that of the region about Hongkong, and that it bears much closer relation to that of India than to that of southern Japan, while the fish fauna to the north of Tokyo contains very little in common with that of Formosa.

One of the new species deserves additional comment. The systematic position of the family of sand launces, or Ammodytidæ, has been long in question. Early writers placed it among the jugular fishes as an ally of the cusks and pearlfishes. It has no ventral fins at all, but as there are no spines in any of the fins, it was presumed that the ventrals, if present, would be few rayed and jugular in position.

More recently the resemblance in general structure of the sand launces to the silversides and other groups called Percesoces, transitional forms between soft-rayed and the more recent spiny-rayed fishes, have led to a reconsideration of this opinion. The Percesoces have abdominal ventrals and the spines little developed. Two arguments in favor of this view have seemed to have value. In 1811 Pallas described an *Ammodytes septipinnis* from the Aleutian Islands. This species, not since recognized, is said to be an Ammodytes, or sand launce, with the ventral fins eight-rayed and abdominal. For this species Dr. Gill has suggested the generic name of Rhynchias.

In the Oligocene rocks of Puy-de-Dôme Dr. Gervais has discovered a fossil fish, now called *Cobitopsis acuta*, which resembles a sand launce in most respects, and is referred to the Ammodytidæ by Boulenger. In this species the ventrals are six rayed, and abdominal. The dorsal fin, unlike that of Ammodytes, is rather shorter than the anal and opposite to it. There are no fin spines. The long dorsal, without fin spines, the numerous vertebræ and abdominal ventrals with six or eight rays, appear also in the extinct family of Crossognathidæ of the Cretaceous. This family is certainly allied to the Percesoces. This evidence seemed conclusive, and the sequence of families, Crossognathidæ, Cobitopsidæ, Ammodytidæ, and Atherinidæ, seemed a natural one.

The tropical Ammodytidæ, having normal scales and fewer vertebræ, have been referred to the genus Bleekeria. In the collection

from Formosa is a new species, *Bleekeria mitsukurii*, which differs from the other species of Bleekeria in the presence of ventral fins. These are very small, jugular in position, and composed of a slender spine and three rays. The scales in this species are very small, about 115 in a longitudinal series, this count being, by a slip of the copyist, omitted in the published description. This species shows conclusively that the Ammodytidæ are not related to the Percesoces, are not derived from Cobitopsis or Crossognathus, and that their real place is with the ophidioid fishes and Fierasfer. The Formosan species is the type of a distinct genus, characterized by the presence of ventral fins. For this, the name Embolichthys Jordan and Evermann (ἔμβολος, a hint) has been elsewhere proposed. D. S. J.

Fishes of Japan. — The series of monographic reviews of the fishes of Japanese waters is continued by Jordan and Fowler, and Jordan and Snyder, in the *Proceedings* of the United States National Museum. (Vol. XXV). There is included: 1. A "Review of the Salmonoid Fishes," the Salmonidæ, (10 species); the Argentinidæ, (4 species), and the Salangidæ, (2 species). Four salmon (*Oncorhynchus masou*, *O. keta*, *O. kisutch*, and *O. nerka*) are found in Japan, one of these, *O. masou*, not yet known from any other region. One salmon trout, *Salmo perryi*, is found in all streams of middle and northern Japan. A large pikelike trout, *Hucho blackistoni*, common in northern Japan, finds its only analogue in the huchen (*Hucho hucho*) on the Danube. There are three charrs in Japan, — one common, *Salvelinus pluvius*; the other two, *S. kundsha* and *S. malma*, confined to the northern islands. The ayu, *Plecoglossus altivelis*, is found in all rivers. It is one of the finest food fishes in the world, — a sort of dwarf salmon with peculiar dentition.

Of the smelt, *Osmerus dentex*, *Mesopus olidus*, and *Mesopus japonicus* are described, besides a new species *Argentina kagoshimæ*. Besides the diminutive and fragile Japanese ice-fish, *Salanx microdon*, a second species, *Salanx ariakensis* is described from manuscripts of Dr. Kishinouye.

The part of this paper of popular interest in Japan is condensed in an article, "The Salmon and Trout of Japan," in the "*Annotationes zoologicæ Japonenses*," published by the Imperial University of Tokyo.

2. A "Review of the Labroid Fishes and Related Forms" includes 45 species: of Pomacentridæ, 11; Labridæ, 31; and Scaridæ (3). The new species are *Stethojulis psacas*, *S. terina*, *S. trossula*, and